Remarks

Claim 4 is currently amended. Claims 1 and 4-6 are pending in the application.

In the Office Action of June 6, 2007, claims 4 and 5 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for being dependent on a previously canceled claim. Applicants respectfully traverse the rejection. Claim 4 has been amended to depend from currently pending claim 1, and claim 5 depends from claim 4. Claims 4 and 5, therefore, are no longer indefinite since they depend from a currently pending claim.

In the Office Action of June 6, 2007, claims 1 and 6 were rejected under 35 U.S.C. §102(b) as anticipated by US Patent No. 5,015,789 to Arntz et al (the '789 patent), or, alternatively, as obvious under 35 U.S.C. §103(a) over the '789 patent. Applicants respectfully traverse the rejection.

Claim 1 is directed to a fuel cell engine coolant comprised of an aqueous 1,3-propanediol, which, among other characteristics, has an electrical resistivity of greater than 250 Kohm-cm. Claim 6 depends from claim 1.

The '789 patent is directed to a method for producing 1,3-propanediol. Acrolein and water are reacted in the presence of an acidic ion exchanger resin to form an aqueous solution of 3-hydroxypropionaldehyde. The aqueous solution of 3-hydroxypropionaldehyde may be hydrogenated to form 1,3-propanediol, or the 3-hydroxypropionaldehyde may be extracted from the aqueous solution with a polar organic solvent and the polar organic solvent containing the 3-hydroxypropionaldehyde may be hydrogenated to form 1,3-propanediol, or the 3-hydroxypropionaldehyde may be hydrogenated to 1,3-propanediol in the gaseous phase. *See* '789 patent, col. 4., lines 23-34, lines 51-54, and claim 1.

The Examiner alleges that the '789 patent anticipates or renders claims 1 and 6 obvious citing claim 1 of the '789 patent as disclosing the limitations of claim 1 and its dependent claim 6. Alternatively, the Examiner argues that claims 1 and 6 are inherently disclosed in the '789 patent, acknowledging that the '789 patent is silent with respect to the claim limitation in claim 1 requiring a fuel cell engine coolant have an electrical resistivity of greater than 250 Kohm-cm, but arguing that such electrical resistivity would

have been inherent in the compositions disclosed in the '789 patent because the '789 patent allegedly discloses the same compound as the instant invention.

Although the Examiner cites two grounds for the rejection (the teachings of claim 1 of the '789 patent and inherency as a result of the '789 patent allegedly teaching the same composition as claimed), it appears that both grounds for rejection are inherency based. Claim 1 of the '789 patent, or, for that matter, the entire '789 patent, does not expressly disclose a fuel cell engine coolant comprised of an aqueous 1,3-propanediol solution and having an electrical resistivity of greater than 250 Kohm-cm. As such, any anticipation rejection of claim 1 of the present application must be based on an argument that the '789 patent inherently discloses the claimed composition.

Inherency may not be established by probabilities or possibilities—the allegedly inherent characteristic must necessarily flow from the teaching of the '789 patent. *See In re Robertson*, 169 F.3d 743, 745; 49 U.S.P.Q2d 1949, 1950-51 (Fed. Cir. 1999); and *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). However, the '789 patent does not inherently provide a fuel cell engine coolant comprising an aqueous 1,3-propanediol solution and having the claimed electrical resistivity. First, the '789 patent does not necessarily result in an aqueous 1,3-propanediol solution. The '789 patent is directed to preparing 1,3-propanediol, not an aqueous solution thereof. One method disclosed in the '789 patent for preparing 1,3-propanediol is hydrating acrolein with water to form an aqueous solution of 3-hydroxypropionaldehyde, and then hydrogenating the 3-hydroxypropionaldehyde in a gaseous phase to produce the 1,3-propanediol. *See* '789 patent, col. 4, lines 51-54, and claim 1. The resulting 1,3-propanediol is not an aqueous solution of 1,3-propanediol as required in claim 1 of the present application—and is not a fuel cell engine coolant comprising an aqueous solution of 1,3-propanediol and having an electrical resistivity of greater than 250 Kohm-cm.

Another method disclosed for preparing 1,3-propanediol in the '789 patent is to extract the 3-hydroxypropionaldehyde from the aqueous hydration reaction mixture with a polar organic solvent and then hydrogenate the 3-hydroxypropionaldehyde to form 1,3-propanediol. The resulting hydrogenated reaction mixture is an organic solution containing 1,3-propanediol, not an aqueous solution of 1,3-propanediol as required in claim 1 of the present application—and is not a fuel cell engine coolant comprising an

aqueous solution of 1,3-propanediol and having an electrical resistivity of greater than 250 Kohm-cm.

Even if the aqueous solution of 3-hydroxypropionaldehyde resulting from the hydration of acrolein in the presence of an acidic cation exchanger resin is hydrogenated according to the process of the '789 patent as an aqueous solution, the resulting aqueous 1,3-propanediol solution does not inherently have an electrical resistivity of greater than 250 Kohm-cm useful to form a fuel cell engine coolant having an electrical resistivity of greater than 250 Kohm-cm. The '789 patent does not specify that the water used in hydration of acrolein in the presence of an acidic ion exchange resin has low ion concentration—e.g. the water may be tap water or deionized water. The water and acrolein are contacted with an acidic ion exchage resin to form the 3-hydroxypropionaldehyde. The ion exchange resin, at best, exchanges an equivalent amount of ions with the water/acrolein solution leaving the ionic concentration of the aqueous solution the same, or, if multivalent ions are present in the water/acrolein solution, the ion exchange resin may provide additional ions to the water/acrolein solution in the formation of the aqueous 3-hydroxypropionaldehyde solution. According to the '789 patent, acrolein may be removed from the resulting aqueous 3-hydroxypropionaldehyde solution prior to hydrogenation, but the '789 patent does not disclose removal of any ions from the aqueous 3-hydroxypropionaldehyde solution—so any ions therein will be present in the hydrogenation step and will be present in the aqueous 1,3-propanediol product produced by the hydrogenation step. The ionic concentration in the aqueous 1,3-propanediol, therefore, will be equivalent to or greater than the ionic concentration of the water used in the initial step of the process.

The electrical resistivity of the aqueous 1,3-propanediol formed in the process of the '789 patent, therefore, may or may not be greater than 250 Kohm-cm dependent on the ionic concentration of the water used in the initial step, and whether additional ions are added into the solution by contact with the ion exchange resin. As shown by the declaration of Dr. Glenn Komplin submitted with the Applicants response of December 5, 2006, aqueous 1,3-propanediol solutions containing tap water have significantly different electrical resistivity than aqueous 1,3-propanediol solutions containing deionized water, and aqueous solutions of 1,3-propanediol formed with tap water may

have an electrical resistivity far below 250 Kohm-cm. As such, if tap water were used in as the water in the process of the '789 patent, the resulting aqueous 1,3-propanediol solution may have an electrical resistivity below 250 Kohm-cm. As a result, fuel cell engine coolant compositions formed with an aqueous 1,3-propanediol produced in accordance with the process of the '789 patent are not necessarily provided with an electrical resistivity of greater than 250 Kohm-cm by the aqueous 1,3-propanediol solution. Therefore, the fuel cell engine coolant composition as claimed in claim 1 and its dependent claim 6 of the present invention are not inherently disclosed by the '789 patent.

Further, the compositions claimed in claims 1 and 6 of the present application are not obvious under 35 U.S.C. §103(a) from the '789 patent. The '789 patent does not inherently provide the claimed compositions, as discussed above. The '789 patent also makes no disclosure at all regarding the electrical resistivity of any composition. One skilled in the art, therefore, would receive no guidance from the '789 patent that would render claims 1 and 6 of the present application obvious in light of the '789 patent.

In the Office Action of June 6, 2007, the Examiner maintained the provisional rejection of claims 1 and 4-6 on the ground of nonstatutory obviousness-type double patenting over claims of co-pending Application No. 10/886,298. Applicants respectfully traverse the rejection. Applicants reiterate their response of December 11, 2006 and March 12, 2007, which has not been addressed by the Examiner—apparently because other rejections remaining outstanding the in present application, and the provisions of MPEP §804(I)(1) apply only when the nonstatutory obviousness-type double patenting rejection is the only rejection remaining in the applicaton.

In light of the above, Applicants respectfully request allowance of the remaining pending claims 1 and 4-6.

Respectfully submitted,

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